AMENDMENTS TO THE CLAIMS

Please amend the claims without prejudice or disclaimer to read as follows:

1 (currently amended). A vehicle having an integrated propulsion and guidance system, the vehicle comprising:

an engine configured to rotate a driveshaft;

an impeller coupled to the driveshaft to thereby propel the vehicle, wherein the impeller comprises a hub and a plurality of blades, wherein ~~at least one of~~ the plurality of blades ~~is~~ comprises at least one pivotable blade pivotably mounted to the hub and at least one fixed blade rigidly fixed to the hub; and

a control system coupled to the impeller, wherein the control system is configured to provide a control signal to the impeller to ~~pivot~~ produce blade pitch oscillations of the at least one pivotable blade ~~the at least one of the plurality of blades with respect to the hub~~ as the plurality of blades rotate about the hub, and to vary the phase and magnitude of the blade pitch oscillations as the impeller rotates about the hub to thereby simultaneously ~~propelling and guiding~~ propel and guide the vehicle with the impeller.

2 (original). The vehicle of claim 1, wherein the impeller is a four-blade impeller, and wherein an opposing pair of the plurality of blades is pivotable with respect to the hub.

3 (original). The vehicle of claim 1, wherein the plurality of blades comprises an odd number of blades, and wherein an odd number of the plurality of blades are pivotable with respect to the hub.

4 (original). The vehicle of claim 1, wherein the plurality of blades comprises an even number of blades, and wherein an even number of the plurality of blades are pivotable with respect to the hub.

5 (original). The vehicle of claim 1 wherein the control signal comprises a sinusoidal waveform.

6 (original). The vehicle of claim 1 wherein the control signal comprises a sawtooth waveform.

7 (original). The vehicle of claim 1 wherein the control system is further configured to adjust the phase of the control signal to thereby adjust the phase of the blade pitch adjustment applied to the at least one of the plurality of blades.

8 (original). The vehicle of claim 7 wherein the control system is further configured to adjust the magnitude of the control signal to thereby adjust the magnitude of the blade pitch adjustment applied to the at least one of the plurality of blades.

9 (original). The vehicle of claim 1 further comprising a second impeller configured to rotate in an opposite direction from the impeller, wherein the second impeller comprises a second hub and a second plurality of blades, and wherein at least one of the second plurality of blades is pivotable with respect to the second hub.

10 (original). The vehicle of claim 9 wherein the control system is further configured to provide a second control signal to the second impeller to pivot the at least one of the second plurality of blades with respect to the second hub as the second plurality of blades rotates about the second hub.

11 (currently amended). A propulsion system for a vehicle having an engine, the propulsion system comprising:

an impeller rotationally coupled to the engine via a driveshaft, the impeller comprising a hub and a plurality of blades, wherein the plurality of blades comprises at least one pivotable blade having a variable pitch with respect to the impeller hub and at least one fixed blade rigidly coupled to the hub; and

a control system coupled to the impeller, wherein the control system is configured to provide a control signal to the impeller to thereby ~~adjust the variable~~ oscillate the blade pitch of the at least one pivotable blade as the ~~pivotable blade~~ plurality of blades rotates about the hub and to vary the phase of the blade pitch oscillations to thereby simultaneously propel and guide the vehicle with the impeller.

12 (currently amended). An impeller configured to rotate on a driveshaft for a vehicle, the impeller comprising:

an impeller hub;

a plurality of fixed impeller blades rigidly coupled to the impeller hub, each of the fixed impeller blades having a common blade pitch; and

at least one pair of pivotable impeller blades pivotably coupled to the impeller hub, wherein each of the pivotable impeller blades are operable to pivot with respect to the impeller hub to thereby create blade pitch oscillations as the impeller rotates about the impeller hub, and wherein a phase of the blade pitch oscillations is variable to thereby adjust the lateral force applied on the driveshaft and to thereby steer the vehicle.

13 (currently amended). A method of controlling the heading of a vehicle with an impeller having a plurality of impeller blades and a hub, wherein the plurality of impeller blades comprises at least one fixed blade rigidly mounted to the hub and at least one pivotable blade pivotably coupled to the hub, the method comprising the steps of:

rotating the impeller about a driveshaft to produce propulsive force;

generating a control signal ~~for at least one of the plurality of impeller blades, wherein the control signal has~~ having an amplitude and a phase corresponding to a desired heading of the vehicle; and

~~pivoting~~ oscillating ~~at least one of the plurality of impeller blades~~ the at least one pivotable blade as the impeller rotates about the driveshaft in response to the control signal to produce a torque on the driveshaft having a magnitude and phase corresponding to the magnitude and phase of the control signal; and

varying the magnitude and phase of the control signal to thereby control the heading of the vehicle.

14 (original). The method of claim 13 wherein the rotating step comprises selecting a forward or reverse direction for rotating the impeller.

15 (original). The method of claim 13 wherein the control signal has a substantially sinusoidal waveform.

16 (original). The method of claim 13 wherein the control signal has a substantially sawtooth waveform.

17 (currently amended). A system for producing a desired heading in a vehicle, the system comprising:

an impeller means rotating on a driveshaft, the impeller means comprising a plurality of impeller blades having at least one fixed blade and at least one pivotable blade;

means for rotating the impeller means about the driveshaft to produce propulsive force;

means for generating a control signal having an amplitude and a phase corresponding to the desired heading of the vehicle; and

means for ~~pivoting at least one of the plurality of impeller blades~~ oscillating the at least one pivotable blade as the impeller rotates about the driveshaft in response to the control signal to produce a torque on the driveshaft having a magnitude and phase corresponding to the magnitude and phase of the control signal; and

means for varying the magnitude and phase of the control signal to thereby place the vehicle in the desired heading.